

素数及其快速判定的新方法与应用

潘树明 著

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内 容 简 介

本书在阐述素数的基本理论和基本概念的基础上,介绍了快速判定素数的新定理、新方法及其应用,用这种新方法比传统方法提高判定效率 7~10 倍。此外,本书还介绍了素数性质、奇偶数性质的 22 个定理、双生素数性质的 37 个猜想及 10 个素数猜想。书后附有 300000 以内的素数表。

本书可供数学爱好者阅读,也可供从事数学、计算机工作的人员参考。

Synopsis

Based on the basic theories and concepts of prime numbers, puts forward new theorems, new methods and their application on discrimination of prime numbers increasing discrimination efficiency by 7-10 times, provides 22 theorems on properties of prime numbers and odd and even numbers, 37 conjectures on properties of twin prime numbers, and 10 conjectures on prime numbers. The appendix includes the prime numbers less than 300,000.

This book is applicable for math enthusiast, and it also can be a reference for the people in the field of mathematics and computer.

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前 言

在大于 1 的整数中,除 1 和其本身之外,不被任何数除尽的数称为素数。素数在数论中占有特殊的地位。任何数都可以用素数的乘积表示,所以素数是数中的“原子”,是构成自然数的基本元素。掌握了任何一个数的素因子分解,数学家就获得了有关这个数的信息。人们一直把素数判定取得的结果看成是人们的重要精神财富。在试验新计算机的效率和硬件性能时,用素数构成多位数,以便为材料加密。在现代数学应用中,例如编码时,就需要讨论某些类别有限域及其上的多项式。这些有限域就是由素数 P 做成的 $Z/PZ = \{\overline{0}, \overline{1}, \dots, \overline{P-1}\}$,这就要求我们必须去寻找素数、判定素数。

素数判定从古至今一直受到人们重视,是因为素数判定这个问题具有很大的理论价值和实用价值。

本书中所列出的作者多年来研究的素数判定的新定理、新方法比一般常用的筛选法可提高计算速度 7~10 倍,具有准确、效率高的特点。利用这些定理可以引出一个双生素数定理:“大于 5 的两个差为 2 的相邻双生素数有无限多个,而且每对双生素数之间相差之数为 6 的倍数。”

数学家卡尔·弗里德列希·高斯 (Karl Friedrich Gauss) 曾经说过:“高等算术中一些最美丽的定理具有这样的特性:它们极易从经验事实中归纳出来,但是证明却隐藏很深,只有高人一等的研究者才能把它们挖掘出来。正是出于这种原因,赋予高等算术以神奇魅力,使之成为第一流数学家们最喜爱的科学。至于它远远凌驾于数学的其他分支之上的无限丰富性,就更不必提了。”

本书也将作者与数学家廖震合作多年研究出的素数性质、奇偶数性质 22 个定理及推论刊出。如能为初等数论内容起到添砖加瓦的作用,作者将感到十分荣幸。

在数学中,数论是最美的一个分支,从古至今,一直受到专家和数学爱好者的偏爱,而双生素数是美中之美的数。本书也给出了作者对双生素数性值的 37 个猜想和 10 个素数猜想。数学猜想是数学发展的一个重要思维方式。它具有创新性,尽管这种猜想目标很具体,且正确与否有待于人们去证明。

本书中也给出了 30 万以内的素数,以便于研究和使用者查找。

本书在编写过程中,由潘锋工程师承担了全部中译英工作和打字工作。在此对廖震、潘锋、李总成先生的帮助表示衷心感谢。

尽管书中内容不太完善,作者借 ICM-2002 国际数学大会之机将此书献给广大数学家及数学爱好者。由于水平所限和时间仓促,不足之处难免,欢迎批评指正。

潘树明

2002 年 6 月

Preface

Prime number is the number which can not be divided by any number except for 1 and itself. Prime numbers play important role in number theory. Any number can be expressed as the product of prime numbers, so prime numbers are 'atoms' of numbers – basic elements of natural numbers. Once grasping prime factor explosion for a number, mathematicians obtain information about this number. People always regard the result of discrimination of prime numbers as important spirit treasure. During efficiency and hardware testing of a new computer, multi – digit number is made of prime numbers to encrypt confidential materials. The more important usage is in modern application mathematics, for example, certain limited regions are required to be discussed in encoding. These limited regions are $Z/PZ = \{\bar{0}, \bar{1}, \dots, \overline{P-1}\}$ made up of prime number P , which asks us to look for prime numbers and discriminate prime numbers.

Discrimination of prime numbers has been all along thought highly of, for it has great theoretical and practical value.

This book lists new theorems and methods on discrimination of prime numbers being studied for many years by the author, which can increase computation speed by 7 – 10 times comparing with normal filters and so are accurate and efficient. With these theorems, there comes out a twin prime numbers theorem: "there are infinite neighboring twin prime numbers larger than 5 in which the difference of the two numbers is 2, and the difference of every pair of twin prime numbers is a multiple of 6."

Mathematician Karl Friedrich Gauss has ever stated: "some

beautiful theorems in higher arithmetic have such attributes: they are easy concluded from experiences but deeply concealed for proving. Only super mathematicians can dig them out. Just for this reason, higher arithmetic has amazing charm and becomes the favorite of excellent mathematicians. Even no need to comment on its infinite abundance beyond other branches of mathematics.”

This book also lists 22 theorem and deductions on properties of prime numbers and odd and even numbers being studied by Pan Shuming and Mathematician Liaozen for many years. If they can be supplement for number theory, the author will be greatly honored.

In mathematics, number theory is the most beautiful branch and twin prime numbers are beautiful – in – beautiful. This book also lists 37 conjectures of twin prime numbers and 10 conjectures on prime numbers made out by the author. Conjectures in mathematics are an important thinking method. It has innovation, though this kind of conjectures have concrete targets and are under proving.

This book also provides prime numbers less than 300,000 for researchers’ and users’ convenience.

During the writing, Mr. Pan Feng took on the whole translation and typing job. The author are greatly grateful to Mr. Liao Zhen, Pan Feng and Li Zongcheng here. The author would like to present this book to mathematicians during ICM – 2002. Because of ability limit and time shortage, there may be inevitable deficiencies. If you have any comments and suggestions, please let the author know.

Pan Shuming
June, 2002

目 录

1	素数判定的新定理、新方法	(1)
1.1	素数判定的新定理	(2)
1.2	比较	(3)
1.3	讨论	(6)
1.4	判定素数应用举例	(7)
1.5	结论	(9)
2	双生素数的性质以及有关素数的猜想	(10)
3	素数、奇偶数的性质及定理	(13)
	参考文献	(20)

Catalogue

1	New Theorems and Methods for Discrimination of Prime Numbers	(21)
1.1	New theorem for discrimination of prime number	(22)
1.2	Comparison	(24)
1.3	Discussion	(28)
1.4	Application examples in discrimination of prime numbers	(29)
1.5	Conclusion	(31)
2	Properties of Twin Prime Numbers and Conjectures on Prime Numbers	(33)
3	Properties and Theorems of Prime Numbers and Odd and Even Numbers	(37)

References (46)

附录:30 万以内素数表

Appendix: List of prime numbers less than
300,000 (47)

1 素数判定的新定理、新方法

本章提出了素数判定的新定理、新方法。用本章提出的新定理、新方法可提高运算速度,并引出大于 5 的双生素数有无限多个,每对双生素数之间相差之数为 6 的倍数。本章提出的定理及方法在计算机科学、研究 RSA 密钥码体制中、大素数寻找、计算数论中有广泛的应用。

在历史上,素数曾吸引了大批数学家:高斯(Gauss)、费马(Fermat)、欧拉(Euler)、勒让德(Legendre)花费大量的精力和时间研究它。高斯在他的《算术讨论》(*Disquisitiones Arithmeticae*)中曾这样写到:“把素数同合数鉴别开来及将合数分解成素因子乘积被认作是算术中最重要、最有用问题之一。”中国的《易经》一书也对这个重要问题做了研究。

将合数分解成素因子的乘积是算术基本定理的构造性方面之需要。在快速数论变换中研讨的 Z/nZ 的乘法群的构造就依赖于将 n 分解为素因子的乘积。要具体建立 RSA 体制(鲁梅利(Rumely)、沙米尔(Shamir)、埃德勒曼(Adleman)三人发明的公开密钥码体制)就需要两个大素数,就必须寻找大素数问题。在现代计算机科学发展中,人们用计算的观点研讨数学分支理论体系——数论,形成了当前重要的分支——计算数论。计算数论中重要组成部分就是素数判别。不难看出,素数判定对计算机科学来说是有十分重要价值的。

计算数论中提出:是否存在判别素数的多项式方法,是当前悬而未决的难题之一。

对于素数判定,从古至今,曾提出了许多方法,但仍认为“试除法”是最简单的素数判别法。和其相关的埃拿托申斯(Eratosthenes)筛选法对制作素数表起了重大的作用。当今,人们多么希望尽早找到一种素数判别的多项式算法,然而这尚需进一步去研

究。在尚未找到素数判别多项式法之前,能否找到比“试除法”更简便的计算快速的运算方法、素数判别的新定理、新方法?本章就是针对这一问题,为解决这一问题寻找到一个比“试除法”更简便、计算速度提高几倍的素数判定新定理、新方法。

1.1 素数判定的新定理

定理: $n \in \mathbf{N}$, $f(n) = 6n \pm 1$ 数列自然数中划去能被小于 $\sqrt{f(n)}$ 的素数整除之数,添上 2 和 3 两个数,即为全部素数。

证明: 设数列 5, 7, 11, 13, 17, 19, ..., n

$$P_0=5, P_1=7, P_3=11, \cdots, P_r \leq \sqrt{n} < P_{r+1}$$

将数列中依次划去:

$$\begin{aligned} &5P_0, 7P_0, 11P_0, 13P_0, \cdots \\ &5P_1, 7P_1, 11P_1, 13P_1, \cdots \\ &5P_2, 7P_2, 11P_2, 13P_2, \cdots \\ &\cdots \\ &5P_r, 7P_r, 11P_r, 13P_r, \cdots \end{aligned} \tag{1-1}$$

此后所剩下的数,都不能被 P_0, P_1, \cdots, P_r 各素数所整除。假设所剩下的数中有其复合数:

$$Q = d \times P_m$$

其中, Q 为 n 内的数, P_m 为不同于 P_0, P_1, \cdots, P_r 的素因数, d 和 P_m 都是大于 1 的整数,故 $Q = d \times P_m \leq n$ 。由于 $n \in \mathbf{N}$,又小于 \sqrt{Q} 的整数都除不尽,所以 $d > \sqrt{Q}, P_m > \sqrt{Q}$,而得 $d \times P_m > \sqrt{Q} \times \sqrt{Q} = Q$,这与 $d \times P_m = Q$ 是相矛盾的。所以如果 $n \in \mathbf{N}$,而小于 \sqrt{Q} 的整数都除尽,则 Q 不是素数。由上所述, Q 是复合数,则 Q 一定有 $n \in \mathbf{N}$ 而小于 \sqrt{Q} 的因数。由于 $n \in \mathbf{N}$,则 Q 的大于 1 的最小因数一定是素数,所以 $f(n) = 6n \pm 1$ 中将式 1-1 中划去之后所剩下的数都不能被 P_0, P_1, \cdots, P_r 各素数所整除,因此 Q 必定是素数,应有下式:

$$Q < \sqrt{n} < P_{r+1}$$

d 是 $r+1$ 个中某一个素数,必在式 1-1 中被划除,故 n 内所剩之数均为素数,故式 1-1 可简化为:

$$\begin{aligned} &P_0^2, 5P_0, 7P_0, 11P_0, \cdots \\ &P_1^2, 7P_1, 11P_1, 13P_1, \cdots \\ &P_2^2, 11P_2, 17P_2, 19P_2, \cdots \\ &\quad \cdots \end{aligned}$$

定理证毕。

1.2 比较

例:判定 100 内的素数,逐一系列出。

解:运用前述定理 $f(n) = 6(n) \pm 1$,列出 $n = 1, 2, 3, \cdots, 16$ 时的数,即:5, 7, 11, 13, 17, 19, 23, 25, 29, 31, 35, 37, 41, 43, 47, 49, 53, 55, 59, 61, 65, 67, 71, 73, 77, 79, 83, 85, 89, 91, 95, 97,共 32 个。

$\sqrt{100}$ 内大于 5 的素数为 5, 7。

将 100 内的复合数逐次划去:

划去被 5 整除的数(5 除外),即:

25, 35, 55, 65, 85, 95。

划去被 7 整除的数(7 除外),即:

49, 77, 91。

再根据定理,将 2、3 两个素数放入,得出 100 以内的全部素数是:

2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97,共 25 个。

为了对比说明本定理的优点,用现在应用的一般方法(非本文定理方法)判定 $n = 100$ 内的素数有哪些。

列出:(1 除外)从 2, 3, 4, 5, \cdots , 99, 100 数列将 100 内复合数逐次一一划去,即将 100 内能被 2, 3, 5, 7 整除的数划去。

划去被 2 整除的数(2 除外,49 个):

4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82, 84, 86, 88, 90, 92, 94, 96, 98, 100。

划去被 3 整除的数(3 除外,16 个):

9, 15, 21, 27, 33, 39, 45, 51, 57, 63, 69, 75, 81, 87, 93, 99。

划去被 5 整除的数(5 除外,6 个):

25, 35, 55, 65, 85, 95。

划去被 7 整除的数(7 除外,3 个):

49, 77, 91。

所剩余的数如下:

2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97, 即为 100 以内的全部素数。用一般方法判定 100 以内素数要划去的次数为: $49 + 16 + 6 + 3 = 74$ (次),而用本定理要划去的次数为: $6 + 3 = 9$ (次),减少了 65 次。

例:判定 200 内的全部素数有哪些?

解:用本文提出的定理的做法。

用 $f(n) = 6n \pm 1$ 列出 $n = 1, 2, \dots, 33$ 时所有的数:

5, 7, 11, 13, 17, 19, 23, 25, 29, 31, 35, 37, 41, 43, 47, 49, 53, 55, 59, 61, 65, 67, 71, 73, 77, 79, 83, 85, 89, 91, 95, 97, 101, 103, 107, 109, 113, 115, 119, 121, 125, 127, 131, 133, 137, 139, 143, 145, 149, 151, 155, 157, 161, 163, 167, 169, 173, 175, 179, 181, 185, 187, 191, 193, 197, 199。

$\sqrt{200}$ 内大于 5 的素数是:5, 7, 11, 13。

将 200 内复合数逐次划去:

划去被 5 整除的数(5 除外):

25, 35, 55, 65, 85, 95, 115, 125, 145, 155, 175, 185。

划去被 7 整除的数(7 除外):

49, 77, 91, 119, 133, 161。

划去被 11 整除的数(11 除外):121, 143, 187。

划去被 13 整除的数(13 除外):169。

再根据本定理,将 2、3 两个素数放入,得出 200 以内全部素数是:

2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97, 101, 103, 107, 109, 113, 127, 131, 137, 139, 149, 151, 157, 163, 167, 173, 179, 181, 191, 193, 197, 199, 共 46 个。

为了对比说明,对此例使用非本文定理的方法判定 $n = 200$ 内的素数。具体做法是:

列出(1 除外)2, 3, 4, 5, ..., 199, 200 数列,将 200 以内复合数逐次一一划去,即将 $\sqrt{200}$ 内能被 2, 3, 5, 7, 11, 13 整除的数划去:

划去被 2 整除的数(2 除外, 99 个):

4, 6, 8, 10, ..., 198, 200

划去被 3 整除的数(3 除外, 32 个):

9, 15, 21, 27, 33, 39, 45, 51, 57, 63, 69, 75, 81, 87, 93, 99, 105, 111, 117, 123, 129, 135, 141, 147, 153, 159, 165, 171, 177, 183, 189, 195

划去被 5 整除的数(5 除外, 12 个):

25, 35, 55, 65, 85, 95, 115, 125, 145, 155, 175, 185。

划去被 7 整除的数(7 除外, 6 个):

49, 77, 91, 119, 133, 161。

划去被 11 整除的数(11 除外, 3 个):

121, 143, 187。

划去被 13 整除的数(13 除外, 1 个):

169。

所剩下的数如下:

2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97, 101, 103, 107, 109, 113, 127, 131, 137, 149, 151, 157, 163, 167, 173, 179, 181, 191, 193, 197, 199。

用一般方法判定 200 以内素数要划去的次数为： $99 + 32 + 12 + 6 + 3 + 1 = 153$ (次)，而用本定理要划去的次数为： $12 + 6 + 3 + 1 = 22$ (次)，减少了 $153 - 22 = 131$ (次)。

表 1-1 用本定理方法和用一般筛选法判定素数划去次数的比较

判定方法	100 内	200 内	1000 内
用一般方法划去次数	74	153	825
用本定理法划去次数	9	22	94

从表 1-1 看出，用本定理给出的素数判定新方法比一般通用的筛素数法减少筛(划去)次数大约 7~10 倍，可以说提高效率或者提高计算速度 7~10 倍。说明用本定理去做“素数判别”具有效率高、速度快 7~10 倍的优点。

1.3 讨论

直观地讲，我们列出以 6 为公差的 6 个数列如下：

第一个数列：2, 8, 14, 20, 26, 32, 38, 44

第二个数列：3, 9, 15, 21, 27, 33, 39, 45

第三个数列：4, 10, 16, 22, 28, 34, 40, 46

第四个数列：6, 12, 18, 24, 30, 36, 42, 48

第五个数列：5, 11, 17, 23, 29, 35, 41, 47

第六个数列：7, 13, 19, 25, 31, 37, 43, 49

本定理给出的素数判定方法，巧妙地运用公差为 6 的上述六个等差级数中的第五个、第六个两个，即素数(补充 2 和 3 两数)集中在第五个、第六个两个数列，在这两个数列中要筛去的数即复合数中均有一个素数因子在其中，例如运用本定理给出的方法求 $f(n) = 1000$ 内的素数有哪些？列出 $6n \pm 1$ 的数列，要筛去被 5

整除的数可归结为一个公式: $5 + 5(n \pm 1) \times 6$,要筛去被 7 整除的可归纳一个公式 $7 + 30(n - 1)$,要筛去的被 13 整除的归纳为 13 乘以 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73 诸素数,要筛去的被 17 整除的归纳为 17 乘以 17, 19, 23, 29, 31, 37, 41, 43, 47, 53 诸素数,要筛去的被 23 整除的归纳为 23 乘以 23, 29, 31, 37, 41, 43 诸素数。要筛去被 29 整除的归纳为 29 乘以 29, 31 两个素数,要筛去被 31 整除的只有一个即 $961 = 31 \times 31$,即素数 31^2 。

1.4 判定素数应用举例

例:判定 4999 是否素数。

解: $\sqrt{4999} = 70.7036$,用本定理给出的公式 $f(n) = 6n \pm 1$ 列出数列,式中 $n = 1, 2, 3, \dots, 10, 11$,相应的数列为:5, 7, 11, 13, 17, 19, 23, 25, 29, 31, 35, 37, 41, 43, 47, 49, 53, 55, 59, 61, 65, 67。

因为 $\sqrt{70.7036} = 8.4$,即用小于 8 的素数 5 和 7 整除上数列(2、3 两素数除外)。划去被 5 整除的数:25, 35, 55, 65;划去被 7 整除的数:49。余下的素数为:

5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67。用这些素数除 4999,均不能整除,故 4999 为素数。

例:判定 128431 是否素数。

解: $\sqrt{128431} = 258.37$,用本定理给出的公式 $f(n) = 6n \pm 1$ 列出数列,式中 $n = 1, 2, 3, \dots$,相应的数列为:5, 7, 11, 13, 17, 19, 23, 25, 29, 31, 35, 37, 41, 43, 47, 49, 53, 55, 59, 61, 65, 67, 71, 73, 77, 79, 83, 85, 89, 91, 95, 97, 101, 103, 107, 109, 113, 115, 119, 121, 125, 127, 131, 133, 137, 139, 143, 145, 149, 151, 155, 157, 161, 163, 167, 169, 173, 175, 179, 181, 185, 187, 191, 193, 197, 199, 203, 205, 209, 211, 215, 217, 221, 223, 227, 229, 233, 235, 239, 241, 245, 247, 251, 253, 257。

因为 $\sqrt{258.37}=16.07$,即用小于 16 的素数 5, 7, 11, 13 去整除上数列。划去被 5 整除的数:25, 35, 55, 65, 85, 95, 115, 125, 145, 155, 175, 185, 205, 215, 235, 245;划去被 7 整除的数:49, 77, 91, 119, 113, 161, 203, 217;划去被 11 整除的数:121, 143, 187, 209, 253;划去被 13 整除的数:169, 221, 247。余下的素数为:5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97, 101, 103, 107, 109, 113, 115, 127, 131, 137, 139, 149, 151, 157, 163, 167, 173, 179, 181, 191, 193, 197, 199, 211, 223, 227, 229, 233, 239, 241, 251, 257。用这些数除 128431,发现均不能整除,故 128431 是素数。

根据前述定理可以提出一个关于双生素数定理:

大于 5 的两个近邻素数相差 2 的双生素数有无限多个,而且每对双生素数之间相差的数为 6 的倍数。

如:5, 7; 11, 13; 17, 19; 29, 31; 41, 43; 59, 61; 71, 73; 101, 103; 107, 109; 137, 139; 191, 193; 197, 199; 227, 229, ...

双生素数 5, 7 和 11, 13 之间 $11-5=6, 13-7=6$;双生素数 11, 13 和 17, 19 之间 $17-11=6, 19-13=6$;双生素数 29, 31 和 41, 43 之间 $41-29=12, 43-31=12$;...

证明: $n \in \mathbf{N}, f(n) = 6n \pm 1$, 可写为 $f(n) = 5 + 6(n-1)$ 和 $f(n) = 7 + 6(n-1)$ 两个数列($n=1, 2, \dots, \infty$), 得出两个公差为 6 的等差级数。分别按本定理求出各素数, 划掉复合数(含素因子)之后, 余下的素数间隔为 6 的倍数; 将两个数列合在一起, 由于数列 $f(n) = 5 + 6(n-1)$ 和 $f(n) = 7 + 6(n-1)$ 相差为 2, 故双生素数相差为 2。

下面再用反证法证明本题: 假设双生素数有很多个, 共有 n 个, 就是 $P_1, P_2, P_3, \dots, P_n$, 其中 $P_1=5, P_2=7, P_3=11, P_4=13, \dots$ 。令 $Q = P_1, \dots, P_{n+1}$, 如果 Q 是双生素数, 则因 Q 不等于 $P_1, P_2, P_3, \dots, P_n$ 中的任何一个, 故双生素数的个数最少有 n

+1 个,与双生素数的个数共有 n 个相矛盾,故不是 n 个而是有无限多个,和 $f(n)=6n \pm 1$ 数列 ($n=1, 2, \dots, \infty$) 有无限多个相一致。

1.5 结论

(1) 定理: $n \in \mathbf{N}$, $f(n)=6n \pm 1$ 数列自然数中划去所有能被小于 $\sqrt{f(n)}$ 的素数整除的数,添上 2 和 3 两个数,即为全部素数。

(2) 运用本定理可判定素数。与试除法、埃拿托申斯(Eratosthenes)筛选法相比,划去的次数仅是 $1/7 \sim 1/10$ 。

(3) 利用本定理可以引出一个双生素数定理:大于 5 的两个近邻素数相差 2 的双生素数有无限多个,而且每对双生素数之间相差之数为 6 的倍数。

2 双生素数的性质以及有关素数的猜想

邻近两个素数之差为 2 的相邻素数称为双生素数或素数对，素数对有无限多个，有如下性质：

- (1) 两个素数对之差为偶数。
- (2) 每对素数之间相差之数为 6 的倍数(能被 2 和 3 整除)。
- (3) 素数对的两个数平方和为偶数。
- (4) 素数对的两个数平方差为偶数。
- (5) 大于 11 的素数对两个数中较大素数的平方的个位数字为 1,3 或 9。
- (6) 大于 11 的素数对两个数中较小素数的平方的个位数字为 1,7 或 9。
- (7) 每个素数对的两个素数平方为奇数,以 1 或 9 为个位数字。
- (8) 每个素数对的两个素数平方和为偶数,以 0 或 2 为个位数字。
- (9) 每个素数对的两个素数平方差为偶数,以 0,2 或 8 为个位数字。
- (10) 每个素数对的两个素数之积为奇数,以 3 或 9 为个位数字。
- (11) 每个素数对的两个素数中较大的数除以较小的数得到的商为小于 2 的递减的数。
- (12) 每个素数对的两个素数中较小的数的立方为奇数,以 1,3 或 9 为个位数字。
- (13) 每个素数对的两个素数中较大的数的立方为奇数,以 1,7 或 9 为个位数字。
- (14) 每个素数对的两个素数立方和是以 0,2 或 8 为个位数字的数。

(15) 每个素数对的两个素数立方差是以 2 或 6 为个位数字的数。

(16) 素数对中两个素数的平方积为奇数,以 1 或 9 为个位数字。

(17) 素数对中两个素数的平方和为偶数,以 0 或 2 为个位数字。

(18) 素数对中每个数的四次方的个位数字均为 1。

(19) 素数对中两个数的四次方之和是个位数字为 2 的数。

(20) 素数对中两个数四次方之差是 10 的倍数(个位数字为 0 的数)。

(21) 素数对中两个数四次方之积是个位数字为 1 的数。

(22) 素数对中每一个数的五次方的个位数字与素数对本身的个位数字相同。

(23) 素数对中每一个数的五次方减去本身是 10 的倍数(个位数字为 0 的数)。

(24) 素数对中每一个数的五次方的乘积是个位数字为 3 或 9 的数。

(25) 素数对中每一个数的六次方是个位数字为 1 或 9 的奇数,与其平方的个位数字相同。

(26) 素数对中每一个数的七次方的个位数字中较小的一个是个位数字为 1,3 或 9 的奇数。

(27) 素数对中每一个数的七次方的个位数字中较大的一个是个位数字为 1,7 或 9 的奇数。

(28) 每个素数对的两个素数七次方之和是个位数字为 0,2 或 8 的数。

(29) 每个素数对的两个素数七次方之差是个位数字为 2 或 6 的数。

(30) 素数对中每一个数的八次方的个位数字均为 1。

(31) 素数对中两个数八次方之和是个位数字为 2 的数。

(32) 素数对中两个数八次方之差是 10 的倍数(个位数字为

0 的数)。

(33) 素数对中两个数八次方之积是个位数字为 1 的数。

(34) 素数对中每一个数的九次方的个位数字与素数对本身的个位数字相同。

(35) 素数对中每一个数的九次方减去本身是 10 的倍数(个位数字为 0 的数)。

(36) 素数对中每一个数的九次方的乘积是个位数字为 3 或 9 的数。

(37) 素数对中每一个数的十次方的个位数字是个位数字为 1 或 9 的奇数,与其平方的个位数字相同。

有关素数的猜想:

(1)任何素数 九 次方的个位数与素数本身的个位数相同。

(2)任何素数 六 次方的个位数与素数本身的个位数相同。

(3)任何素数 六 次方与其立方之差均为偶数。

(4)任何素数 六 次方与其立方之和均为偶数。

(5)任何素数 六 次方与其四次方之差均为偶数。

(6)任何素数 六 次方与其四次方之和均为偶数。

(7)大于等于 七 的任何素数的八次方的个位数为 1。

(8)大于等于 七 的素数的八次方减去 1 均为 10 的倍数。

(9)任何素数 十 次方与其平方之差为 10 的倍数。

(10)任何素数 十一 次方的个位数与其立方的个位数相同。

3 素数、奇偶数的性质及定理^①

定理 1:两个相邻奇数之和加上两个相邻奇数之积为奇数。

证明:设一个奇数为 $2k+1$, 则其相邻奇数为 $2k+3$,

$$(2k+1) + (2k+3) = 2(2k+2)$$

由 $(2k+2) \in \mathbf{Z}$ 得出 $2(2k+2)$ 为偶数。

再设另一个奇数为 $2k_1+1$, 其相邻奇数为 $2k_1+3$,

$$\begin{aligned}(2k_1+1) \times (2k_1+3) \\&= 4k_1^2 + 8k_1 + 3 \\&= (4k_1^2 + 8k_1 + 2) + 1 \\&= 2(2k_1^2 + 4k_1 + 1) + 1\end{aligned}$$

由 $(2k_1^2 + 4k_1 + 1) \in \mathbf{Z}$ 得出 $2(2k_1^2 + 4k_1 + 1) + 1$ 为奇数。

因此:

$$\begin{aligned}2(2k+2) + 2(2k_1^2 + 4k_1 + 1) + 1 \\&= 2(2k+2 + 2k_1^2 + 4k_1 + 1) + 1\end{aligned}$$

因为 $2(2k+2 + 2k_1^2 + 4k_1 + 1)$ 为偶数, 所以 $2(2k+2 + 2k_1^2 + 4k_1 + 1) + 1$ 为奇数。

命题证毕。

定理 2:两个相邻奇数之和减去任意一个奇数, 其差为奇数。

证明:设一个奇数为 $2k+1$, 则其相邻奇数为 $2k+3$ ($k \in \mathbf{Z}$), 于是得

$$\begin{aligned}(2k+1) + (2k+3) - (2k_1+1) \\&= 4k+4 - 2k_1 - 1 \\&= 2(2k - k_1 + 1) + 1\end{aligned}$$

因为 $k \in \mathbf{Z}$ 且 $(2k - k_1 + 1) \in \mathbf{Z}$, 所以 $2(2k - k_1 + 1) + 1$ 为奇

① 本章定理由廖震、潘树明共同研究编写。

数。

命题证毕。

定理 3:任何一个大于 3 的奇自然数可表达为相邻自然数之和加上这两个自然数之积。

证明:设相邻两自然数为 n_1 和 $n_1 + 1$, 再设大于 3 的奇自然数为 $2n + 1$, 其中 $n \in \mathbf{N}$ 且 $n \geq 2$ 。

欲使 $2n + 1 = [n_1 + (n_1 + 1)] + n_1(n_1 + 1)$

只需 $2n + 1 = 2n_1 + 1 + n_1^2 + n_1$

$$2n = n_1^2 + 3n_1$$

$$2n = n_1(n_1 + 3)$$

显然, 左边 $= 2n \geq 4$ (是偶自然数)

右边:

(1) 当 n_1 为奇自然数时, $n_1 + 3$ 为偶自然数。推导出 $n_1(n_1 + 3)$ 为偶自然数。

(2) 当 n_1 为偶自然数时, $n_1 + 3$ 为奇自然数。推导出 $n_1(n_1 + 3)$ 为偶自然数。

当且仅当 $n_1 \in \mathbf{N}$ 且 $n_1 \geq 1$ 时, 则有 $n_1(n_1 + 3) \geq 4$ 。

命题证毕。

定理 4:偶数可以表示为两个相邻偶数之和加上两个相邻偶数之积。

证明:设一偶数为 $2k$ ($k \in \mathbf{Z}$), 两相邻偶数为 $2k_1$ 和 $2k_1 + 2$, 另两个相邻偶数为 $2k_2$ 和 $2k_2 + 2$, ($k_1, k_2 \in \mathbf{Z}$)。

欲使 $2k = [2k_1 + (2k_1 + 2)] + 2k_2(2k_2 + 2)$

只需 $2k = (4k_1 + 2) + 4k_2^2 + 4k_2$

$$k = 2(k_2^2 + k_2 + k_1) + 1 \quad (3-1)$$

这是不定方程, 对于任意一个奇数 k , 都能相应地找到 $k_1, k_2 \in \mathbf{Z}$ 的值使式 3-1 成立。

命题证毕。

定理 5:两个相邻的自然数之和加上两个相邻自然数之积为奇自然数。

证明: 设一个自然数为 n_1 , 其相邻自然数为 $n_1 + 1$; 另一个自然数为 n_2 , 其相邻自然数为 $n_2 + 1$ 。 n_2 和 $n_2 + 1$ 中必有一个是偶数, 所以 $n_2(n_2 + 1)$ 是偶数。

令 $n_2(n_2 + 1) = 2k$ ($k \in \mathbf{N}$), 则:

$$\begin{aligned} & [n_1 + (n_1 + 1)] + n_2(n_2 + 1) \\ &= 2n_1 + 1 + 2k \\ &= 2(n_1 + k) + 1 \end{aligned}$$

因为 $(n_1 + k) \in \mathbf{Z}$, 所以 $2(n_1 + k) + 1$ 为奇自然数。

命题证毕。

定理 6: 两个相邻偶数之和加上两个相邻偶数之积为偶数。

证明: 设一个偶数为 $2k_1$ ($k_1 \in \mathbf{Z}$), 其相邻偶数为 $2k_1 + 2$; 设另一个偶数为 $2k_2$, 其相邻偶数为 $2k_2 + 2$ 。

$$2k_1 + (2k_1 + 2) = 4k_1 + 2 = 2(2k_1 + 1)$$

因为 $2(2k_1 + 1)$ 为偶数, $2k_2(2k_2 + 2)$ 显然是偶数, 所以:

$$[2k_1 + (2k_1 + 2)] + [2k_2(2k_2 + 2)] = 2[2k_1 + 1 + k_2(2k_2 + 2)] \text{ 为偶数, } [2k_1 + 1 + k_2(2k_2 + 2)] \in \mathbf{Z}。$$

命题证毕。

定理 7: 任何正偶数可以写成两个奇数的平方和。

证明: 设这个正偶数为 $2n$ ($n \in \mathbf{N}$), 两个奇数分别是 $2k_1 + 1$ 和 $2k_2 + 1$, ($k_1, k_2 \in \mathbf{Z}$)。

$$\text{要证明 } 2n = (2k_1 + 1)^2 + (2k_2 + 1)^2$$

$$\text{只需 } 2n = 4k_1^2 + 4k_1 + 1 + 4k_2^2 + 4k_2 + 1$$

$$2n = 2(2k_1^2 + 2k_2^2 + 2k_1 + 2k_2 + 1)$$

因为 $2k_1^2 + 2k_2^2 + 2k_1 + 2k_2 + 1 \in \mathbf{Z}$, 所以可令 $2k_1^2 + 2k_2^2 + 2k_1 + 2k_2 + 1 = a \in \mathbf{Z}$, 只需 $2n = 2a$, 即 $n = a$ 。

显然, 在 $2k_1^2 + 2k_2^2 + 2k_1 + 2k_2 + 1 = a$ 中的 k_1 和 k_2 值存在 (这是不定方程), 命题证毕。

另一个证明方法: 设两个奇数为 $2k_1 + 1$ 和 $2k_2 + 1$ ($k_1, k_2 \in \mathbf{Z}$), 正偶数为 $2k$ ($k \in \mathbf{N}$)。

欲使 $2k = (2k_1 + 1)^2 + (2k_2 + 1)^2$

只需 $2k = 4(k_1^2 + k_2^2 + k_1 + k_2) + 2$

$$k = 2k_1^2 + 2k_2^2 + 2k_1 + 2k_2 + 1$$

显然这里的 k_1 和 k_2 是存在的,

命题证毕。

定理 8:任何正奇数可以写成三个相同奇数的平方和。

证明:设这个正奇数为 $2k + 1$, ($k \in \mathbf{Z}$ 且 $k \geq 0$)。

要证明 $2k + 1 = 3(2k_1 + 1)^2$ ($k_1 \in \mathbf{Z}$)

只需 $2k + 1 = 12k_1^2 + 12k_1 + 3$

$$2k = 12k_1^2 + 12k_1 + 2$$

$$k = 6k_1^2 + 6k_1 + 1$$

$$6k_1^2 + 6k_1 + (1 - k) = 0$$

命题证毕。

定理 9:从奇(偶)自然数列第二项起,每一项的平方减去它的前一项的平方差所成的新数列是公差为 8 的等差数列。

证明: $a_n = (2n + 1)^2 - (2n - 1)^2 = 8n$ ($n \in \mathbf{N}$)

而 $a_n - a_{n-1} = 8n - 8(n - 1) = 8$ (常数)

$$b_n = (2n + 2)^2 - (2n)^2 = 8n + 4 \quad (n \in \mathbf{N})$$

$$b_n - b_{n-1} = (8n + 4) - [8(n - 1) + 4] = 8 \text{ (常数)}$$

命题证毕。

定理 10:自然数的平方减去它本身的差等于它本身与比它小的相邻自然数之积。

证明:设此自然数为 n 。

$$n^2 - n = n(n - 1)$$

命题证毕。

定理 11:自然数的平方加上它本身的和等于它本身与比它大的相邻自然数之积。

证明:设此自然数为 n ($n \in \mathbf{N}$)

$$n^2 + n = n(n + 1)$$

命题证毕。

定理 12:两个相邻自然数的平方差为奇数。

证明:设 $n \in \mathbf{N}$ 。

$$(n+1)^2 - n^2 = n^2 + 2n + 1 - n^2 = 2n + 1$$

命题证毕。

定理 13:任何奇自然数可以表示为两个相邻自然数的平方差(大数减小数)。

证明:设 $n \in \mathbf{N}$ 。

$$2n + 1 = n^2 - n^2 + 2n + 1 = (n+1)^2 - n^2$$

命题证毕。

定理 14:大于 3 的素数的平方为奇数。

证明:设大于 3 的素数为 p , p 必为奇数, 令 $p = 2n + 1$ ($n \in \mathbf{N}$ 且 $n > 1$):

$$p^2 = (2n + 1)^2 = 4n(n + 1) + 1$$

因为 $4n(n + 1)$ 为偶数, 所以 $4n(n + 1) + 1$ 为奇数。

命题证毕。

定理 15:大于 3 的素数的立方为奇数。

证明:设大于 3 的素数为 p , p 为奇数, 令 $p = 2n + 1$ ($n \in \mathbf{N}$ 且 $n > 1$):

$$p^3 = (2n + 1)^3 = 2n(4n^2 + 6n + 3) + 1$$

因为 $2n(4n^2 + 6n + 3)$ 为偶数, 所以 $2n(4n^2 + 6n + 3) + 1$ 为奇数。

命题证毕。

定理 16:大于 3 的素数的平方减去它的本身的差为以 0, 2 或 6 为个位数字的偶数。

证明:设大于 3 的素数为 p , p 必须为奇数。

$$p^2 - p = p(p - 1)$$

因为 $p - 1 > 0$, 所以 $p^2 - p$ 为两个连续自然数之积, 为偶自然数。

而素数 p 的个位数字为 1, 3, 7 或 9。

$$\begin{aligned}\text{所以} \quad & (10n+1)^2 - (10n+1) \equiv 0 \pmod{10} \\ & (10n+3)^2 - (10n+3) \equiv 6 \pmod{10} \\ & (10n+7)^2 - (10n+7) \equiv 2 \pmod{10} \\ & (10n+9)^2 - (10n+9) \equiv 2 \pmod{10}\end{aligned}$$

其中, $n \in \mathbf{N}$

命题证毕。

定理 17: 大于 3 的素数的立方减去它本身的差为以 0, 4 或 6 为个位数字的偶数。

证明: 设大于 3 的素数为 p , p 为奇数。

$$p^3 - p = (p-1)p(p+1)$$

$p^3 - p$ 等于三个连续自然数之积, 所以 $6 \mid (p^3 - p)$ 。

而素数 p 的个位数字为 1, 3, 7 或 9。

所以 $(10n+1)^3 - (10n+1) \equiv 0 \pmod{10} \quad (n \in \mathbf{N})$

$$(10n+3)^3 - (10n+3) \equiv 4 \pmod{10} \quad (n \in \mathbf{N})$$

$$(10n+7)^3 - (10n+7) \equiv 6 \pmod{10} \quad (n \in \mathbf{N})$$

$$(10n+9)^3 - (10n+9) \equiv 6 \pmod{10} \quad (n \in \mathbf{N})$$

所以 $p^3 - p$ 为以 0, 4 或 6 为个位数字的偶数。

命题证毕。

定理 18: 大于 7 的素数的 4 次方的个位数字必为 1。

证明: 设大于 7 的素数为 p , p 为奇数, 而奇数的个位数字必为 1, 3, 7 或 9。

$$(10n+1)^4 \equiv 1 \pmod{10} \quad (n \in \mathbf{N})$$

$$(10n+3)^4 \equiv 1 \pmod{10} \quad (n \in \mathbf{N})$$

$$(10n+7)^4 \equiv 1 \pmod{10} \quad (n \in \mathbf{N})$$

$$(10n+9)^4 \equiv 1 \pmod{10} \quad (n \in \mathbf{N})$$

命题证毕。

定理 19: 素数的 5 次方的个位数字和此素数本身的个位数相同。

证明: 设此素数为 p , 当 $p=2$ 时, $2^5=32$, 而 32 的个位数字为 2(本身)。

当 $p \neq 2$ 时, p 必为奇数, 其个位数字必为 1, 3, 7 或 9。

$$(10n + 1)^5 \equiv 1 \pmod{10} \quad (n \in \mathbf{N})$$

$$(10n + 3)^5 \equiv 3 \pmod{10} \quad (n \in \mathbf{N})$$

$$(10n + 7)^5 \equiv 7 \pmod{10} \quad (n \in \mathbf{N})$$

$$(10n + 9)^5 \equiv 9 \pmod{10} \quad (n \in \mathbf{N})$$

命题证毕。

推论 1: 素数的 5 次方加上它本身的和为偶数。

推论 2: 素数的 5 次方减去它本身的差必为 10 的倍数。

定理 20: 素数的 6 次方减去它本身的差必为偶数。

证明: 设此素数为 p 。

$$p^6 - p = p(p^5 - 1) = p(p - 1)(p^4 + p^3 + p^2 + p + 1)$$

因为 $p(p - 1)$ 为两个连续自然数之积, 所以 $p(p - 1)$ 为偶数。

所以 $p^6 - p$ 为偶数。

命题证毕。

定理 21: 素数的 6 次方减去它本身的平方必为 10 的倍数。

证明: 设此素数为 p 。

当 $p = 2$ 时, $2^6 - 2^2 = 64 - 4 = 60$, 命题成立。

当 $p \neq 2$ 时, p 必为奇数, 而 p 的个位数字必为 1, 3, 7 或 9。

$$(10n + 1)^6 - (10n + 1)^2 \equiv 0 \pmod{10} \quad (n \in \mathbf{N})$$

$$(10n + 3)^6 - (10n + 3)^2 \equiv 0 \pmod{10} \quad (n \in \mathbf{N})$$

$$(10n + 7)^6 - (10n + 7)^2 \equiv 0 \pmod{10} \quad (n \in \mathbf{N})$$

$$(10n + 9)^6 - (10n + 9)^2 \equiv 0 \pmod{10} \quad (n \in \mathbf{N})$$

命题证毕。

定理 22: 大于 5 的素数的立方减去比它小的素数的立方差必为偶数。

证明: 设 p_G 为大于 5 的素数, p_L 为小于 5 的素数, 且 $p_G > p_L$, 所以 p_G 和 p_L 均为奇数。

设 $p_G = 2k_1 + 1$, $p_L = 2k_2 + 1$ ($k_1, k_2 \in \mathbf{Z}$ 且 $k_1 > k_2$)。

所以 $p_G^3 - p_L^3 = (2k_1 + 1)^3 - (2k_2 + 1)^3$
 $= 2(k_1 - k_2)[4(k_1^2 + k_1k_2 + k_2^2) + 6(k_1 + k_2) + 3]$
 而 $(k_1 - k_2) \in \mathbf{N}, [4(k_1^2 + k_1k_2 + k_2^2) + 6(k_1 + k_2) + 3] \in \mathbf{N}$
 所以上式右边为偶数。
 命题证毕。

参 考 文 献

- 1 孙琦,旷京华.素数判定与大数分解.沈阳:辽宁教育出版社,1987
- 2 何宝起.基原素数论.大连:大连出版社,1998
- 3 潘树明.数理统计在冶金中的应用.有色矿山,1983
- 4 陈景润.初等数论.北京:科学出版社,1978

Prime Numbers and a new Method of Discrimination and its Application

Pan Shuming

1 New Theorems and Methods for Discrimination of Prime Numbers

This chapter brings forward “a New theorem and method for discrimination of prime numbers”. Using the new theorem and method in this paper may improve calculating speed and introduce that there are unlimited amount of twin prime numbers great than 5, the difference of every pair of twin prime numbers is a multiple of 6. The theorem and method given in this paper will have extensive application in computer science, RSA Key system research, big prime number finding and computing number theory.

Prime numbers discrimination has been paid great attention from ancient time. In the history, this question attracted a lot of mathematician, for example, Gauss, Fermat, Euler and Legedre to spend great time on research. Gauss wrote in his Disquistions Arithmeticae; To make prime numbers distinguished with composite numbers and to decompose composite numbers into prime factors is the most import and useful question in arithmetic. Chinese Book of Changes also made research to this important question.

To decompose composite numbers into prime factors is the demand of constructive aspect of arithmetic basic theorem. The construction of multiplication groups of Z/nZ discussed in the quick

number theory conversion just depends on decomposing n into product of prime factors. Two big prime numbers are required in setting up RSA system (the open key system invented by Rumely, Shamir, Adleman). In modern computer science development, people use viewpoints of computing to research mathematics branch theory system—number theory, which forms currently important branch—computation number theory. The important component in computation number theory is discrimination of prime numbers. It is not difficult to make out that discrimination of prime numbers is most valuable to computer science.

It is put forward in the computation number theory that whether multinomial method in computation number theory exists or not is still a pending problem nowadays.

From ancient time up to now, many methods have been put forward for discrimination of prime numbers. It is well-known that the Dividing Attempt Method is the simplest discrimination of prime numbers. The relevant Eratosthenes filtering method plays an important role in making prime numbers table. Today, people wish to find out a kind of multinomial arithmetic for discrimination of prime number as soon as possible. It is still under research. Is it possible to find out a new easier theorem and method in the case that multinomial method can not be found in discrimination of prime number? For this question, a new theorem and method easier than the Dividing Attempt Method is introduced in this paper.

1.1 New theorem for discrimination of prime number

Theorem:

Among natural numbers in $f(n) = 6n \pm 1$ number sequence (where $n \in \mathbf{N}$), remove numbers which can be divided exactly by prime numbers less than $\sqrt{f(n)}$, then add 2 and 3 at the begin-

ning, it can make up all prime numbers.

Proving: suppose a number sequence 5, 7, 11, 13, 17, 19, ..., n

$$P_0=5, P_1=7, P_3=11, \cdots, P_r \leq \sqrt{n} < P_{r+1}$$

Remove the following from the above sequence:

$$\begin{aligned} &5P_0, 7P_0, 11P_0, 13P_0, \cdots \\ &5P_1, 7P_1, 11P_1, 13P_1, \cdots \\ &5P_2, 7P_2, 11P_2, 13P_2, \cdots \\ &\quad \cdots \\ &5P_r, 7P_r, 11P_r, 13P_r, \cdots \end{aligned} \tag{1-1}$$

Any of the remains can not be divided exactly by any of prime numbers P_0, P_1, \cdots, P_r . Suppose there is a composite number Q in the remains:

$$Q = d \times P_m$$

where Q is a number less than n , P_m is a prime factor different from P_0, P_1, \cdots, P_r . Both d and P_m are integers great than 1, so $Q = d \times P_m \leq n$. Because $n \in \mathbf{N}$ and integers which are less than \sqrt{Q} can not be divided by exactly, thus $d > \sqrt{Q}$ and $P_m > \sqrt{Q}$, which makes $d \times P_m > \sqrt{Q} \times \sqrt{Q} = Q$ and conflicts with $d \times P_m = Q$. If $n \in \mathbf{N}$ and integers which are less than \sqrt{Q} can all be divided by exactly, Q is not a prime number. As a result, Q is a composite number, Q should have factors less than \sqrt{Q} ($n \in \mathbf{N}$). Because $n \in \mathbf{N}$, the smallest factor of Q greater than 1 must is a prime number, the remains in $f(n) = 6n \pm 1$ after removing numbers in formula (1-1) can not be divided exactly by any of prime numbers P_0, P_1, \cdots, P_r , so Q must be a prime number, resulting the following formula:

$$Q < \sqrt{n} < P_{r+1}$$

d is one of these $r + 1$ prime numbers and must be removed in formula (1-1), the remains in n are all prime numbers, so formula (1-1) may be simplified as:

$$\begin{aligned} &P_0^2, 5P_0, 7P_0, 11P_0, \dots \\ &P_1^2, 7P_1, 11P_1, 13P_1, \dots \\ &P_2^2, 11P_2, 17P_2, 19P_2, \dots \\ &\dots \end{aligned}$$

The proposition is proved.

1.2 Comparison

Example: Discriminate prime numbers within 100, and list them.

Solution:

Using $f(n) = 6(n) \pm 1$, list out numbers where $n = 1, 2, 3, \dots, 16$. Those are 5, 7, 11, 13, 17, 19, 23, 25, 29, 31, 35, 37, 41, 43, 47, 49, 53, 55, 59, 61, 65, 67, 71, 73, 77, 79, 83, 85, 89, 91, 95, 97. Total count is 32.

The prime numbers great than 5 and less than $\sqrt{100}$ are 5 and 7

Remove composite numbers less than 100 in turn:

Remove numbers can be divided exactly by 5 (except for 5):
25, 35, 55, 65, 85, 95.

Remove numbers can be divided exactly by 7 (except for 7):
49, 77, 91.

According to this theorem, put two prime numbers 2 and 3 in and makes out all prime numbers less than 100:

2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97. Total count is 25.

To describe the excellence of this theorem by comparison, we uses general method (not the method in this paper) to discriminate

prime numbers within $n = 100$.

Remove composite numbers less than 100 from 2, 3, 4, 5, ..., 99, 100 number sequence (except for 1) in turn, that is to remove numbers less than 100 which can be divided exactly by 2, 3, 5, 7.

Remove numbers which can be divided exactly by 2 (except for 2, total count is 49):

4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82, 84, 86, 88, 90, 92, 94, 96, 98, 100.

Remove numbers which can be divided exactly by 3 (except for 3, total count is 16):

9, 15, 21, 27, 33, 39, 45, 51, 57, 63, 69, 75, 81, 87, 93, 99.

Remove numbers which can be divided exactly by 5 (except for 5, total count is 6):

25, 35, 55, 65, 85, 95.

Remove numbers which can be divided exactly by 7 (except for 7, total count is 3):

49, 77, 91.

The remains are as follows:

2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97. These are all prime numbers less than 100.

The removing times is $49 + 16 + 6 + 3 = 74$, whereas removing times with new theorem is $6 + 3 = 9$, which drops 65.

Example: Discriminate all prime numbers less than 200.

Solution: use the method in this theorem.

Use $f(n) = 6n \pm 1$ ($n = 1, 2, \dots, 33$) to list:

5, 7, 11, 13, 17, 19, 23, 25, 29, 31, 35, 37, 41, 43, 47,

49, 53, 55, 59, 61, 65, 67, 71, 73, 77, 79, 83, 85, 89, 91, 95, 97, 101, 103, 107, 109, 113, 115, 119, 121, 125, 127, 131, 133, 137, 139, 143, 145, 149, 151, 155, 157, 161, 163, 167, 169, 173, 175, 179, 181, 185, 187, 191, 193, 197, 199.

Prime numbers less than $\sqrt{200}$ are 5, 7, 11, 13.

Remove composite numbers less than 200 in turn:

Remove numbers which can be divided exactly by 5 (except for 5):

25, 35, 55, 65, 85, 95, 115, 125, 145, 155, 175, 185.

Remove numbers which can be divided exactly by 7 (except for 7):

49, 77, 91, 119, 133, 161.

Remove numbers which can be divided exactly by 11 (except for 11):

121, 143, 187.

Remove numbers which can be divided exactly by 13 (except for 13):

169.

Then put two prime numbers 2 and 3 in according this theorem, making out all prime numbers less than 200:

2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97, 101, 103, 107, 109, 113, 127, 131, 137, 139, 149, 151, 157, 163, 167, 173, 179, 181, 191, 193, 197, 199. Total count is 46.

For comparison, this subject uses current method to discriminate all prime numbers less than $n = 200$, the concrete way is:

List number sequence 2, 3, 4, 5, \dots , 199, 200 (except for 1), remove composite numbers less than 200 in turn, that is to remove numbers less than $\sqrt{200}$ which can be divided exactly by 2, 3, 5, 7, 11, 13:

Remove numbers which can be divided exactly by 2 (except for 2, total count is 99):

4, 6, 8, 10, ..., 198, 200.

Remove numbers which can be divided exactly by 3 (except for 3, total count is 32):

9, 15, 21, 27, 33, 39, 45, 51, 57, 63, 69, 75, 81, 87, 93, 99, 105, 111, 117, 123, 129, 135, 141, 147, 153, 159, 165, 171, 177, 183, 189, 195.

Remove numbers which can be divided exactly by 5 (except for 5, total count is 12):

25, 35, 55, 65, 85, 95, 115, 125, 145, 155, 175, 185.

Remove numbers which can be divided exactly by 7 (except for 7, total count is 6):

49, 77, 91, 119, 133, 161.

Remove numbers which can be divided exactly by 11 (except for 11, total count is 3):

121, 143, 187.

Remove numbers which can be divided exactly by 13 (except for 13, total count is 1):

169.

the remains are as follows:

2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97, 101, 103, 107, 109, 113, 127, 131, 137, 149, 151, 157, 163, 167, 173, 179, 181, 191, 193, 197, 199.

The removing times is $99 + 32 + 12 + 6 + 3 + 1 = 153$.

The removing times with this theorem is $12 + 6 + 3 + 1 = 22$. It drops $153 - 22 = 131$.

Table 1-1 Comparison of removal times with general method and with this theorem

Different method	Within 100	Within 200	Within 1000
Removal times with general method	74	153	825
Removal times with this theorem	9	22	94

From the table1-1, it is obviously that the removal times with this theorem is 7 – 10 times less than that of general method, which means efficiency or computing speed rises up 7 – 10 times. It means that discrimination of prime numbers with this theorem has excellence of high efficiency and speed up 7 – 10 times.

1.3 Discussion

For easy to watch, we list out six number sequences in which the difference of two neighbor numbers is 6:

The first sequence: 2, 8, 14, 20, 26, 32, 38, 44

The second sequence: 3, 9, 15, 21, 27, 33, 39, 45

The third sequence: 4, 10, 16, 22, 28, 34, 40, 46

The forth sequence: 6, 12, 18, 24, 30, 36, 42, 48

The fifth sequence: 5, 11, 17, 23, 29, 35, 41, 47

The sixth sequence: 7, 13, 19, 25, 31, 37, 43, 49

The removing method in this theorem use skillfully the fifth and sixth of these six sequence of which the difference is 6. In the two sequences, each composite number to be removed has a prime factor.

For example, use the method in this theorem to discriminate prime numbers less than 1000. List out sequence $6n \pm 1$.

The numbers to be removed which can be divided exactly by 5 are in formula: $5 + 5(n \pm 1) \times 6$

The numbers to be removed which can be divided exactly by 7

are in formula: $7 + 30(n - 1)$.

The numbers to be removed which can be divided exactly by 13 are the result of 13 multiplying prime numbers 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73 separately.

The numbers to be removed which can be divided exactly by 17 are the result of 17 multiplying prime numbers 17, 19, 23, 29, 31, 37, 41, 43, 47, 53 separately.

The numbers to be removed which can be divided exactly by 23 are the result of 23 multiplying prime numbers 23, 29, 31, 37, 41, 43 separately.

The numbers to be removed which can be divided exactly by 29 are the result of 29 multiplying prime numbers 29, 31 separately.

The numbers to be removed which can be divided exactly by 31 is just 31 multiplying 31, that is 961.

1.4 Application examples in discrimination of prime numbers

Example: Discriminate whether 4999 is a prime number

Solution: $\sqrt{4999} = 70.7036$, use the formula $f(n) = 6n \pm 1$ given in this theorem to list sequence. When $n = 1, 2, 3, \dots, 10, 11$, the relative sequence is 5, 7, 11, 13, 17, 19, 23, 25, 29, 31, 35, 37, 41, 43, 47, 49, 53, 55, 59, 61, 65, 67.

Because $\sqrt{70.7036} = 8.4$, we use prime numbers less than 8 (5 and 7) to divide exactly by the above sequence (except for 2 and 3). Remove numbers which can be divided exactly by 5: 25, 35, 55, 65, then number which can be divided exactly by 7: 49. The remains are prime numbers 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67. Because 4999 can not be divided exactly by any of these prime numbers, so it is a prime number.

Example: Discriminate whether 128431 is a prime number.

Solution: $\sqrt{128431} = 258.37$, use the formula $f(n) = 6n \pm 1$

given in this theorem to list sequence. When $n = 1, 2, 3, \dots$, the relative sequence is 5, 7, 11, 13, 17, 19, 23, 25, 29, 31, 35, 37, 41, 43, 47, 49, 53, 55, 59, 61, 65, 67, 71, 73, 77, 79, 83, 85, 89, 91, 95, 97, 101, 103, 107, 109, 113, 115, 119, 121, 125, 127, 131, 133, 137, 139, 143, 145, 149, 151, 155, 157, 161, 163, 167, 169, 173, 175, 179, 181, 185, 187, 191, 193, 197, 199, 203, 205, 209, 211, 215, 217, 221, 223, 227, 229, 233, 235, 239, 241, 245, 247, 251, 253, 257.

Because $\sqrt{258.37} = 16.07$, we use prime numbers less than 16 (5, 7, 11, 13) to divide exactly by the above sequence. Remove numbers which can be divided exactly by 5: 25, 35, 55, 65, 85, 95, 115, 125, 145, 155, 175, 185, 205, 215, 235, 245; remove numbers which can be divided exactly by 7: 49, 77, 91, 119, 113, 161, 203, 217; remove numbers which can be divided exactly by 11: 121, 143, 187, 209, 253; remove numbers which can be divided exactly by 13: 169, 221, 247. The remains are prime numbers 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97, 101, 103, 107, 109, 113, 115, 127, 131, 137, 139, 149, 151, 157, 163, 167, 173, 179, 181, 191, 193, 197, 199, 211, 223, 227, 229, 233, 239, 241, 251, 257. Because 128431 can not be divided exactly by any of these prime numbers, so 128431 is a prime number.

Example: According to the description in this paper, a theorem on twin prime numbers can be made out as follows:

There are unlimited numbers of twin prime numbers greater than 5 for which the difference of two neighbor numbers is 2, and the difference of each pair of twin prime numbers is a multiple of 6.

For example: 5, 7; 11, 13; 17, 19; 29, 31; 41, 43; 59, 61; 71, 73; 101, 103; 107, 109; 137, 139; 191, 193; 197, 199; 227, 229, \dots .

For twin prime numbers 5, 7 and 11, 13, there exists $11 - 5 = 6$, $13 - 7 = 6$; for twin prime numbers 11, 13 and 17, 19, $17 - 11 = 6$, $19 - 13 = 6$; for twin prime numbers 29, 31 and 41, 43, $41 - 29 = 12$, $43 - 31 = 12, \dots$.

Proving: $n \in \mathbf{N}$, $f(n) = 6n \pm 1$ can be written in two sequences $f(n) = 5 + 6(n - 1)$ and $f(n) = 7 + 6(n - 1)$ ($n = 1, 2, \dots, \infty$), making out two arithmetical progressions of which difference is 6. Discriminate any of prime numbers according to this theorem, after removing composite numbers (containing prime factors), the difference of remain prime numbers is a multiple of 6. Join the two sequences together, because the discrepancy of sequences $f(n) = 5 + 6(n - 1)$ and $f(n) = 7 + 6(n - 1)$ is 2, the difference of prime numbers is 2.

Now use apagoge to prove the solution.

Suppose there are n twin prime numbers, i. e. $P_1, P_2, P_3, \dots, P_n$, where $P_1 = 5, P_2 = 7, P_3 = 11, P_4 = 13, \dots$.

let $Q = P_1, \dots, P_{n+1}$, if Q is a twin prime number, because Q is not any of $P_1, P_2, P_3, \dots, P_n$, the count of twin prime numbers is at least $n + 1$, which conflicts with that the count of twin prime numbers is n . So the count is unlimited, which is coincident with sequence $f(n) = 6n \pm 1$ (where $n = 1, 2, \dots, \infty$), instead of n .

1.5 Conclusion

(1) Theorem: Among natural numbers in $f(n) = 6n \pm 1$ number sequence (where $n \in \mathbf{N}$), remove numbers which can be divided exactly by prime numbers less than $\sqrt{f(n)}$, then add 2 and 3 at the beginning, it can make up all prime numbers.

(2) Discrimination of prime numbers can be done with this theorem. To compare with Dividing Attempt Method and Eratosthenes Removal Method, removal times are only one-tenth to one-seventh.

(3) A theorem for twin prime numbers can be introduced using this theorem: there are infinite amount of twin prime numbers greater than 5, the difference of every pair of twin prime numbers is a multiple of 6.

2 Properties of Twin Prime Numbers and Conjectures on Prime Numbers

The neighboring prime numbers of which the difference is 2 is called a prime number pair. The number of prime number pairs is infinite. The prime number pairs have following properties:

(1) The difference of two prime number pairs is an even number.

(2) The difference of every two prime number pairs is a multiple of 6, which can be divided evenly by 2, 3.

(3) The sum of squares of two numbers in a prime number pair is an even number.

(4) The difference of squares of two numbers in a prime number pair is an even number.

(5) In a prime number pair larger than 11, the units digit of the square of the larger number is 1, 3, 9.

(6) In a prime number pair larger than 11, the units digit of the square of the smaller number is 1, 7, 9.

(7) The units digit of the squares of two prime numbers in every prime number pair is an odd number, is 1, 9.

(8) The units digit of the sum of squares of two numbers in a prime number pair is an even number of which units digit is 0 or 2.

(9) The units digit of the difference of squares of two numbers in a prime number pair is an even number of which units digit is 0, 2 or 8.

(10) The product of two numbers in a prime number pair is an odd number of which units digit is 3, 9.

(11) The quotient of the larger one divided by the smaller one

of two numbers in a prime number pair is a descending number less than 2.

(12) The units digits of the cube of the smaller one of two prime numbers in every prime number pair is an odd number of which units digit is 1, 3, 9.

(13) The units digits of the cube of the smaller one of two prime numbers in every prime number pair is an odd number of which units digit is 1, 7, 9.

(14) The sum of cubes of two numbers in a prime number pair is an even number of which units digit is 0, 2, 8.

(15) The difference of cubes of two numbers in a prime number pair is an even number of which units digit is 2, 6.

(16) The product of squares of two numbers in a prime number pair is an odd number of which units digit is 1, 9.

(17) The sum of squares of two numbers in a prime number pair is an even number of which units digit is 0, 2.

(18) The units digit of the fourth power of every number in a prime number pair is always 1.

(19) The sum of the fourth powers of two numbers in a prime number pair is a number of which units digit is 2.

(20) The difference of the fourth power of two numbers in a prime number pair is a multiple of 10 (a number of which units digit is 0).

(21) The product of the fourth power of two numbers in a prime number pair is a number of which units digit is 1.

(22) The units digit of the fifth power of every number in a prime number pair is the same as the units digit of that number.

(23) The difference of the fifth power of every number in a prime number pair and the number itself is a multiple of 10 (a number of which units digit is 0).

(24) The product of the fifth power of every number in a prime number pair is a number of which units digit is 3, 9.

(25) The sixth power of every number in a prime number pair is an odd number of which units digit is 1 or 9, as the same as the units digit of square of that number.

(26) For the units digits of the seventh power of every number in a prime number pair, the smaller units digit is an odd number of which units digit is 1, 3, 9.

(27) For the units digits of the seventh power of every number in a prime number pair, the larger units digit is an odd number of which units digit is 1, 7, 9.

(28) The sum of the seventh power of two numbers in a prime number pair is a number of which units digit is 0, 2, 8.

(29) The difference of the seventh power of two numbers in a prime number pair is a number of which units digit is 2, 6.

(30) The units digit of the eighth power of every number in a prime number pair are always 1.

(31) The sum of the eighth power of two numbers in a prime number pair is a number of which units digit is 2.

(32) The difference of the eighth power of two numbers in a prime number pair is a multiple of 10 (a number of which units digit is 0).

(33) The product of the eighth power of two numbers in a prime number pair is a number of which units digit is 1.

(34) The units digit of the ninth power of every number in a prime number pair is the same as the units digit of that number.

(35) The difference of the ninth power of every number in a prime number pair and the number itself is a multiple of 10 (a number of which units digit is 0).

(36) The product of the ninth power of every number in a

prime number pair is a number of which units digit is 3, 9.

(37) The units digit of the tenth power of every number in a *prime number pair* is an odd number of which units digit is 1 or 9, as the same as the units digit of square of that number.

Conjectures on Prime Numbers:

(1) The units digit of the ninth power of any prime number is the same as the units digit of the prime number.

(2) The units digit of the sixth power of any prime number is the same as the units digit of the prime number.

(3) The difference of the sixth power and the cube of any *prime number* is an even number.

(4) The sum of the sixth power and the cube of any prime number is an even number.

(5) The difference of the sixth power and the forth power of any prime number is an even number.

(6) The sum of the sixth power and the forth power of any prime number is an even number.

(7) The units digit of the eighth power of any prime number greater than or equal to 7 is 1.

(8) The difference of the eighth power of any *prime number* greater than or equal to 7 and 1 is a multiple of 10.

(9) The difference of the tenth power and the square of any prime number is a multiple of 10.

(10) The units digit of the eleventh power of any prime number is the same as the units digit of the cube of the *prime number*.

3 Properties and Theorems of Prime Numbers and Odd and Even Numbers^①

Theorem 1: If the sum of two neighboring odd numbers adds to the product of two neighboring odd numbers, the result is also an odd number.

Proving: suppose an odd number is $2k + 1$ and its neighboring odd number is $2k + 3$, then

$$\begin{aligned}(2k + 1) + (2k + 3) \\ = 2(2k + 2)\end{aligned}$$

Because $(2k + 2) \in \mathbb{Z}$, so $2(2k + 2)$ is an even number.

Suppose another odd number is $2k_1 + 1$ and its neighboring odd number is

$2k_1 + 3$, so

$$\begin{aligned}(2k_1 + 1) \times (2k_1 + 3) \\ = 4k_1^2 + 8k_1 + 3 \\ = (4k_1^2 + 8k_1 + 2) + 1 \\ = 2(2k_1^2 + 4k_1 + 1) + 1\end{aligned}$$

Because $(2k_1^2 + 4k_1 + 1) \in \mathbb{Z}$, so $2(2k_1^2 + 4k_1 + 1) + 1$ is an odd number.

Summarizing the above,

$$\begin{aligned}2(2k + 2) + 2(2k_1^2 + 4k_1 + 1) + 1 \\ = 2(2k + 2 + 2k_1^2 + 4k_1 + 1) + 1\end{aligned}$$

Because $2(2k + 2 + 2k_1^2 + 4k_1 + 1)$, so $2(2k + 2 + 2k_1^2 + 4k_1 + 1) + 1$ is an odd number.

① The theorems in this chapter is jointly studied and writer by Liao Zhen and Pan Shuming.

The proposition is proved.

Theorem 2: If the sum of two neighboring odd numbers subtracts an odd number, the result is also an odd number.

Proving: suppose an odd number is $2k + 1$ and its neighboring odd number is $2k + 3$ ($k \in \mathbb{Z}$), then

$$\begin{aligned}(2k + 1) + (2k + 3) - (2k_1 + 1) \\ = 4k + 4 - 2k_1 - 1 \\ = 2(2k - k_1 + 1) + 1\end{aligned}$$

Because $k \in \mathbb{Z}$ and $(2k - k_1 + 1) \in \mathbb{Z}$,

so $2(2k - k_1 + 1) + 1$ is an odd number.

The proposition is proved.

Theorem 3: An odd natural number greater than 3 can be expressed as a result of the sum of two neighboring natural numbers plus the product of these two natural numbers.

Proving: suppose two neighboring natural numbers are n_1 and $n_1 + 1$, and an odd number greater than 3 is $2n + 1$ ($n \in \mathbb{Z}$ and $n \geq 2$).

To prove $2n + 1 = [n_1 + (n_1 + 1)] + n_1(n_1 + 1)$,

only to make $2n + 1 = 2n_1 + 1 + n_1^2 + n_1$

i. e. $2n = n_1^2 + 3n_1$

i. e. $2n = n_1(n_1 + 3)$

obviously,

the left $= 2n \geq 4$ (an even natural number)

the right:

(1) when n_1 is an odd natural number, $n_1 + 3$ is an even natural number. So $n_1(n_1 + 3)$ is an even natural number.

(2) when n_1 is an even natural number, $n_1 + 3$ is an odd natural number. So $n_1(n_1 + 3)$ is an even natural number.

Only when $n_1 \in \mathbb{N}$ and $n_1 \geq 1$, $n_1(n_1 + 3) \geq 4$.

The proposition is proved.

Theorem 4: An even number can be expressed as a result of the sum of two neighboring even numbers plus the product of two neighboring even numbers.

Proving: suppose an even number is $2k$ ($k \in \mathbf{Z}$), two neighboring even numbers are $2k_1$ and $2k_1 + 2$, other two neighboring even numbers are $2k_2$ and $2k_2 + 2$ ($k_1, k_2 \in \mathbf{Z}$).

To prove $2k = [2k_1 + (2k_1 + 2)] + 2k_2(2k_2 + 2)$

only to make $2k = (4k_1 + 2) + 4k_2^2 + 4k_2$

i. e. $k = 2(k_2^2 + k_2 + k_1) + 1$ (3-1)

This is an indefinite equation. For any of odd numbers k , it should find out correspondingly k_1 and k_2 ($k_1, k_2 \in \mathbf{Z}$) which make equation (3-1) come into existence.

The proposition is proved.

Theorem 5: The result of the sum of two neighboring natural numbers plus the product of two neighboring natural numbers is an odd natural numbers.

Proving: suppose a natural number is n_1 , its neighboring number is $n_1 + 1$; another natural number is n_2 , its neighboring number is $n_2 + 1$.

either of n_2 and $n_2 + 1$ is an even number, so $n_2(n_2 + 1)$ is an even number.

Let $n_2(n_2 + 1) = 2k$ ($k \in \mathbf{N}$), so:

$$[n_1 + (n_1 + 1)] + n_2(n_2 + 1)$$

$$= 2n_1 + 1 + 2k$$

$$= 2(n_1 + k) + 1$$

Because $(n_1 + k) \in \mathbf{Z}$, so $2(n_1 + k) + 1$ is an odd natural number.

The proposition is proved.

Theorem 6: The result of the sum of two neighboring even numbers plus the product of two neighboring even numbers is an even number.

Proving: suppose an even number is $2k_1$ ($k_1 \in \mathbb{Z}$), its neighboring even number is $2k_1 + 2$; other two neighboring even numbers are $2k_2$ and $2k_2 + 2$.

$$2k_1 + (2k_1 + 2) = 4k_1 + 2 = 2(2k_1 + 1)$$

Because $2(2k_1 + 1)$ is an even number and $2k_2(2k_2 + 2)$ is obviously an even number,

$[2k_1 + (2k_1 + 2)] + [2k_2(2k_2 + 2)] = 2[2k_1 + 1 + k_2(2k_2 + 2)]$ is an even number, where $[2k_1 + 1 + k_2(2k_2 + 2)] \in \mathbb{Z}$.

The proposition is proved.

Theorem 7: Any of positive even numbers can be expressed as the sum of squares of two odd numbers.

Proving: suppose a positive even number is $2n$ ($n \in \mathbb{N}$), two odd numbers are $2k_1 + 1$ and $2k_2 + 1$, ($k_1, k_2 \in \mathbb{Z}$).

To prove $2n = (2k_1 + 1)^2 + (2k_2 + 1)^2$

only to make $2n = 4k_1^2 + 4k_1 + 1 + 4k_2^2 + 4k_2 + 1$

i. e. $2n = 2(2k_1^2 + 2k_2^2 + 2k_1 + 2k_2 + 1)$

because $2k_1^2 + 2k_2^2 + 2k_1 + 2k_2 + 1 \in \mathbb{Z}$, let $2k_1^2 + 2k_2^2 + 2k_1 + 2k_2 + 1 = a \in \mathbb{Z}$, so only to prove $2n = 2a$, i. e. $n = a$.

Obviously the values of k_1 and k_2 in $2k_1^2 + 2k_2^2 + 2k_1 + 2k_2 + 1 = a$ (this is an indefinite equation) exist, so the proposition is proved.

Another proving: suppose two odd numbers are $2k_1 + 1$ and $2k_2 + 1$ ($k_1, k_2 \in \mathbb{Z}$), a positive even number is $2k$ ($k \in \mathbb{N}$).

To prove $2k = (2k_1 + 1)^2 + (2k_2 + 1)^2$

only to make $2k = 4(k_1^2 + k_2^2 + k_1 + k_2) + 2$

i. e. $k = 2k_1^2 + 2k_2^2 + 2k_1 + 2k_2 + 1$

obviously the values of k_1 and k_2 here exist, so the proposition is proved.

Theorem 8: Any of positive odd numbers can be expressed as the sum of squares of three same odd numbers.

Proving: suppose an odd number is $2k + 1$, ($k \in \mathbf{Z}$ and $k \geq 0$).

To prove $2k + 1 = 3(2k_1 + 1)^2 (k_1 \in \mathbf{Z})$

only to make $2k + 1 = 12k_1^2 + 12k_1 + 3$

i. e. $2k = 12k_1^2 + 12k_1 + 2$

i. e. $k = 6k_1^2 + 6k_1 + 1$

i. e. $6k_1^2 + 6k_1 + (1 - k) = 0$

The proposition is proved.

Theorem 9: From the second number in an odd (even) natural number sequence, the new number sequence derived from the difference of squares of every number and its neighboring former number is an equal-difference number sequence in which the common difference is 8.

Proving: $a_n = (2n + 1)^2 - (2n - 1)^2 = 8n$ ($n \in \mathbf{N}$)

$a_n - a_{n-1} = 8n - 8(n - 1) = 8$ (a constant)

$b_n = (2n + 2)^2 - (2n)^2 = 8n + 4$ ($n \in \mathbf{N}$)

$b_n - b_{n-1} = (8n + 4) - [8(n - 1) + 4] = 8$ (a constant)

The proposition is proved.

Theorem 10: The difference of the square of a natural number and itself is equal to the product of itself and its neighboring smaller natural number.

Proving: suppose a natural number is n .

$$n^2 - n = n(n - 1)$$

The proposition is proved.

Theorem 11: The sum of the square of a natural number and itself is equal to the product of itself and its neighboring larger natural

number.

Proving: suppose a natural number is n . ($n \in \mathbf{N}$)

$$n^2 + n = n(n + 1)$$

The proposition is proved.

Theorem 12: The difference of squares of two neighboring natural numbers is an odd number.

Proving: suppose $n \in \mathbf{N}$

$$(n + 1)^2 - n^2 = n^2 + 2n + 1 - n^2 = 2n + 1$$

The proposition is proved.

Theorem 13: Any of odd numbers can be expressed as the difference of squares of two neighboring natural numbers.

Proving: suppose $n \in \mathbf{N}$

$$2n + 1 = n^2 - n^2 + 2n + 1 = (n + 1)^2 - n^2$$

The proposition is proved.

Theorem 14: The square of a prime number greater than 3 is an odd number.

Proving: suppose a prime number greater than 3 is p , p must be an odd number, let $p = 2n + 1$ ($n \in \mathbf{N}$ and $n > 1$)

$$p^2 = (2n + 1)^2 = 4n(n + 1) + 1$$

Because $4n(n + 1)$ is an even number, so $4n(n + 1) + 1$ is an odd number.

The proposition is proved.

Theorem 15: The cube of a prime number greater than 3 is an odd number.

Proving: suppose a prime number greater than 3 is p , p must be an odd number, let $p = 2n + 1$ ($n \in \mathbf{N}$ and $n > 1$)

$$p^3 = (2n + 1)^3 = 2n(4n^2 + 6n + 3) + 1$$

Because $2n(4n^2 + 6n + 3)$ is an even number, so $2n(4n^2 + 6n + 3) + 1$ is an odd number.

The proposition is proved.

Theorem 16: The difference of the square of a prime number greater than 3 and itself is an even number with 0, 2, 6 as its units digit.

Proving: suppose a prime number greater than 3 is p , p must be an odd number.

$$p^2 - p = p(p - 1)$$

Because $p - 1 > 0$, so $p^2 - p$ is the product of two sequential natural numbers. So it is an even natural number.

The units digit of the prime number p is 1, 3, 7, 9.

$$\text{So } (10n + 1)^2 - (10n + 1) \equiv 0 \pmod{10}$$

$$(10n + 3)^2 - (10n + 3) \equiv 6 \pmod{10}$$

$$(10n + 7)^2 - (10n + 7) \equiv 2 \pmod{10}$$

$$(10n + 9)^2 - (10n + 9) \equiv 2 \pmod{10}$$

$$n \in \mathbb{N}$$

The proposition is proved.

Theorem 17: The difference of the cube of a prime number greater than 3 and itself is an even number with 0, 4, 6 as its units digit.

Proving: suppose a prime number greater than 3 is p , p must be an odd number.

$$p^3 - p = (p - 1)p(p + 1)$$

$p^3 - p$ is the product of three sequential natural numbers,

$$\text{so } 6 \mid (p^3 - p)$$

The units digit of the prime number p is 1, 3, 7, 9.

$$\text{So } (10n + 1)^3 - (10n + 1) \equiv 0 \pmod{10} \quad (n \in \mathbb{N})$$

$$(10n + 3)^3 - (10n + 3) \equiv 4 \pmod{10} \quad (n \in \mathbb{N})$$

$$(10n + 7)^3 - (10n + 7) \equiv 6 \pmod{10} \quad (n \in \mathbb{N})$$

$$(10n + 9)^3 - (10n + 9) \equiv 6 \pmod{10} \quad (n \in \mathbb{N})$$

so $p^3 - p$ is an even number with 0, 4, 6 as its units digit.

The proposition is proved.

Theorem 18: The units digit of the fourth power of a prime number greater than 7 must be 1.

Proving: suppose a prime number greater than 7 is p , p is an odd number, the units digit of an odd number must be 1, 3, 7, 9.

$$(10n + 1)^4 \equiv 1 \pmod{10} \quad (n \in \mathbf{N})$$

$$(10n + 3)^4 \equiv 1 \pmod{10} \quad (n \in \mathbf{N})$$

$$(10n + 7)^4 \equiv 1 \pmod{10} \quad (n \in \mathbf{N})$$

$$(10n + 9)^4 \equiv 1 \pmod{10} \quad (n \in \mathbf{N})$$

The proposition is proved.

Theorem 19: The units digit of the fifth power of a prime number is same as the units digit of this prime number itself.

Proving: suppose a prime number is p .

When $p = 2$, $2^5 = 32$, and the units digit of 32 is 2 (itself).

When $p \neq 2$, p must be an odd number, its units digit must be 1, 3, 7, 9.

$$(10n + 1)^5 \equiv 1 \pmod{10} \quad (n \in \mathbf{N})$$

$$(10n + 3)^5 \equiv 3 \pmod{10} \quad (n \in \mathbf{N})$$

$$(10n + 7)^5 \equiv 7 \pmod{10} \quad (n \in \mathbf{N})$$

$$(10n + 9)^5 \equiv 9 \pmod{10} \quad (n \in \mathbf{N})$$

The proposition is proved.

Deduction 1: The sum of the fifth power of a prime number and the prime number itself is an even number.

Deduction 2: The difference of the fifth power of a prime number and the prime number itself must be a multiple of 10.

Theorem 20: The difference of the sixth power of a prime number and the prime number itself must be an even number.

Proving: suppose a prime number is p .

$$p^6 - p = p(p^5 - 1) = p(p - 1)(p^4 + p^3 + p^2 + p + 1)$$

Because $p(p-1)$ is the product of two consecutive natural numbers, then $p(p-1)$ is an even number. So $p^6 - p$ is an even number.

The proposition is proved.

Theorem 21: The difference of the sixth power of a prime number and the square of it must be a multiple of 10.

Proving: suppose a prime number is p .

When $p = 2$, $2^6 - 2^2 = 64 - 4 = 60$, the proposition is right.

When $p \neq 2$, p must be an odd number, its units digit must be 1, 3, 7, 9.

$$(10n+1)^6 - (10n+1)^2 \equiv 0 \pmod{10} \quad (n \in \mathbf{N})$$

$$(10n+3)^6 - (10n+3)^2 \equiv 0 \pmod{10} \quad (n \in \mathbf{N})$$

$$(10n+7)^6 - (10n+7)^2 \equiv 0 \pmod{10} \quad (n \in \mathbf{N})$$

$$(10n+9)^6 - (10n+9)^2 \equiv 0 \pmod{10} \quad (n \in \mathbf{N})$$

The proposition is proved.

Theorem 22: The difference of the cube of a prime number greater than 5 and the cube of a prime number less than it must be an even number.

Proving: suppose p_G is a prime number greater than 5 and p_L is a prime number less than 5, $p_G > p_L$. p_G and p_L are both odd numbers.

Suppose $p_G = 2k_1 + 1$, $p_L = 2k_2 + 1$ ($k_1, k_2 \in \mathbf{Z}$ and $k_1 > k_2$).

$$\begin{aligned} p_G^3 - p_L^3 &= (2k_1 + 1)^3 - (2k_2 + 1)^3 \\ &= 2(k_1 - k_2)[4(k_1^2 + k_1k_2 + k_2^2) + 6(k_1 + k_2) + 3] \end{aligned}$$

Where $(k_1 - k_2) \in \mathbf{N}$, $[4(k_1^2 + k_1k_2 + k_2^2) + 6(k_1 + k_2) + 3] \in \mathbf{N}$

The right part of the above equation is an even number.

The proposition is proved.

References

- 1 Sun Qi, Kuang Jinghua. Discrimination of Prime Numbers and Decomposition of Big Numbers. Shenyang: *Liaoning Education Press*, 1987
- 2 He Baoqi. Base Prime Numbers Theory. Dalian: *Dalian Press*, 1998
- 3 Pan Shuming. The Application of Mathematics and Physics in Metallurgy. Metal Mine, 1983
- 4 Chen Jingrun. Preliminary Number Theory. Beijing: *Science Press*, 1978

附录:30 万以内素数表

Appendix: List of prime numbers less than 300,000

2	107	257	421	599	769	967	1151
3	109	263	431	601	773	971	1153
5	113	269	433	607	787	977	1163
7	127	271	439	613	797	983	1171
11	131	277	443	617	809	991	1181
13	137	281	449	619	811	997	1187
17	139	283	457	631	821	1009	1193
19	149	293	461	641	823	1013	1201
23	151	307	463	643	827	1019	1213
29	157	311	467	647	829	1021	1217
31	163	313	479	653	839	1031	1223
37	167	317	487	659	853	1033	1229
41	173	331	491	661	857	1039	1231
43	179	337	499	673	859	1049	1237
47	181	347	503	677	863	1051	1249
53	191	349	509	683	877	1061	1259
59	193	353	521	691	881	1063	1277
61	197	359	523	701	883	1069	1279
67	199	367	541	709	887	1087	1283
71	211	373	547	719	907	1091	1289
73	223	379	557	727	911	1093	1291
79	227	383	563	733	919	1097	1297
83	229	389	569	739	929	1103	1301
89	233	397	571	743	937	1109	1303
97	239	401	577	751	941	1117	1307
101	241	409	587	757	947	1123	1319
103	251	419	593	761	953	1129	1321

1327	1597	1867	2113	2381	2671	2909	3217
1361	1601	1871	2129	2383	2677	2917	3221
1367	1607	1873	2131	2389	2683	2927	3229
1373	1609	1877	2137	2393	2687	2939	3251
1381	1613	1879	2141	2399	2689	2953	3253
1399	1619	1889	2143	2411	2693	2957	3257
1409	1621	1901	2153	2417	2699	2963	3259
1423	1627	1907	2161	2423	2707	2969	3271
1427	1637	1913	2179	2437	2711	2971	3299
1429	1657	1931	2203	2441	2713	2999	3301
1433	1663	1933	2207	2447	2719	3001	3307
1439	1667	1949	2213	2459	2729	3011	3313
1447	1669	1951	2221	2467	2731	3019	3319
1451	1693	1973	2237	2473	2741	3023	3323
1453	1697	1979	2239	2477	2749	3037	3329
1459	1699	1987	2243	2503	2753	3041	3331
1471	1709	1993	2251	2521	2767	3049	3343
1481	1721	1997	2267	2531	2777	3061	3347
1483	1723	1999	2269	2539	2789	3067	3359
1487	1733	2003	2273	2543	2791	3079	3361
1489	1741	2011	2281	2549	2797	3083	3371
1493	1747	2017	2287	2551	2801	3089	3373
1499	1753	2027	2293	2557	2803	3109	3389
1511	1759	2029	2297	2579	2819	3119	3391
1523	1777	2039	2309	2591	2833	3121	3407
1531	1783	2053	2311	2593	2837	3137	3413
1543	1787	2063	2333	2609	2843	3163	3433
1549	1789	2069	2339	2617	2851	3167	3449
1553	1801	2081	2341	2621	2857	3169	3457
1559	1811	2083	2347	2633	2861	3181	3461
1567	1823	2087	2351	2647	2879	3187	3463
1571	1831	2089	2357	2657	2887	3191	3467
1579	1847	2099	2371	2659	2897	3203	3469
1583	1861	2111	2377	2663	2903	3209	3491

3499	3761	4027	4327	4637	4933	5209	5503
3511	3767	4049	4337	4639	4937	5227	5507
3517	3769	4051	4339	4643	4943	5231	5519
3527	3779	4057	4349	4649	4951	5233	5521
3529	3793	4073	4357	4651	4957	5237	5527
3533	3797	4079	4363	4657	4967	5261	5531
3539	3803	4091	4373	4663	4969	5273	5557
3541	3821	4093	4391	4673	4973	5279	5563
3547	3823	4099	4397	4679	4987	5281	5569
3557	3833	4111	4409	4691	4993	5297	5573
3559	3847	4127	4421	4703	4999	5303	5581
3571	3851	4129	4423	4721	5003	5309	5591
3581	3853	4133	4441	4723	5009	5323	5623
3583	3863	4139	4447	4729	5011	5333	5639
3593	3877	4153	4451	4733	5021	5347	5641
3607	3881	4157	4457	4751	5023	5351	5647
3613	3889	4159	4463	4759	5039	5381	5651
3617	3907	4177	4481	4783	5051	5387	5653
3623	3911	4201	4483	4787	5059	5393	5657
3631	3917	4211	4493	4789	5077	5399	5659
3637	3919	4217	4507	4793	5081	5407	5669
3643	3923	4219	4513	4799	5087	5413	5683
3659	3929	4229	4517	4801	5099	5417	5689
3671	3931	4231	4519	4813	5101	5419	5693
3673	3943	4241	4523	4817	5107	5431	5701
3677	3947	4243	4547	4831	5113	5437	5711
3691	3967	4253	4549	4861	5119	5441	5717
3697	3989	4259	4561	4871	5147	5443	5737
3701	4001	4261	4567	4877	5153	5449	5741
3709	4003	4271	4583	4889	5167	5471	5743
3719	4007	4273	4591	4903	5171	5477	5749
3727	4013	4283	4597	4909	5179	5479	5779
3733	4019	4289	4603	4919	5189	5483	5783
3739	4021	4297	4621	4931	5197	5501	5791

5801	6091	6361	6691	6977	7307	7591	7907
5807	6101	6367	6701	6983	7309	7603	7919
5813	6113	6373	6703	6991	7321	7607	7927
5821	6121	6379	6709	6997	7331	7621	7933
5827	6131	6389	6719	7001	7333	7639	7937
5839	6133	6397	6733	7013	7349	7643	7949
5843	6143	6421	6737	7019	7351	7649	7951
5849	6151	6427	6761	7027	7369	7669	7963
5851	6163	6449	6763	7039	7393	7673	7993
5857	6173	6451	6779	7043	7411	7681	8009
5861	6197	6469	6781	7057	7417	7687	8011
5867	6199	6473	6791	7069	7433	7691	8017
5869	6203	6481	6793	7079	7451	7699	8039
5879	6211	6491	6803	7103	7457	7703	8053
5881	6217	6521	6823	7109	7459	7717	8059
5897	6221	6529	6827	7121	7477	7723	8069
5903	6229	6547	6829	7127	7481	7727	8081
5923	6247	6551	6833	7129	7487	7741	8087
5927	6257	6553	6841	7151	7489	7753	8089
5939	6263	6563	6857	7159	7499	7757	8093
5953	6269	6569	6863	7177	7507	7759	8101
5981	6271	6571	6869	7187	7517	7789	8111
5987	6277	6577	6871	7193	7523	7793	8117
6007	6287	6581	6883	7207	7529	7817	8123
6011	6299	6599	6899	7211	7537	7823	8147
6029	6301	6607	6907	7213	7541	7829	8161
6037	6311	6619	6911	7219	7547	7841	8167
6043	6317	6637	6917	7229	7549	7853	8171
6047	6323	6653	6947	7237	7559	7867	8179
6053	6329	6659	6949	7243	7561	7873	8191
6067	6337	6661	6959	7247	7573	7877	8209
6073	6343	6673	6961	7253	7577	7879	8219
6079	6353	6679	6967	7283	7583	7883	8221
6089	6359	6689	6971	7297	7589	7901	8231

8233	8563	8837	9157	9437	9749	10079	10357
8237	8573	8839	9161	9439	9767	10091	10369
8243	8581	8849	9173	9461	9769	10093	10391
8263	8597	8861	9181	9463	9781	10099	10399
8269	8599	8863	9187	9467	9787	10103	10427
8273	8609	8867	9199	9473	9791	10111	10429
8287	8623	8887	9203	9479	9803	10133	10433
8291	8627	8893	9209	9491	9811	10139	10453
8293	8629	8923	9221	9497	9817	10141	10457
8297	8641	8929	9227	9511	9829	10151	10459
8311	8647	8933	9239	9521	9833	10159	10463
8317	8663	8941	9241	9533	9839	10163	10477
8329	8669	8951	9257	9539	9851	10169	10487
8353	8677	8963	9277	9547	9857	10177	10499
8363	8681	8969	9281	9551	9859	10181	10501
8369	8689	8971	9283	9587	9871	10193	10513
8377	8693	8999	9293	9601	9883	10211	10529
8387	8699	9001	9311	9613	9887	10223	10531
8389	8707	9007	9319	9619	9901	10243	10559
8419	8713	9011	9323	9623	9907	10247	10567
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35281	35617	36013	36389	36739	37049	37441	37783
35291	35671	36017	36433	36749	37057	37447	37799
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35327	35747	36073	36469	36781	37117	37493	37847
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[G e n e r a l I n f o r m a t i o n]

书名= 素数及其快速判定的新方法与应用

作者=

页数= 1 4 2

S S 号= 1 1 1 0 9 5 2 1

出版日期=

封面
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前言
目录
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